

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

March 31, 2011

MEMORANDUM

TO: Mr. Calvin W. Leggett, P.E.
Manager, Program Development Branch

FROM: Ms. Lynnise M. Hawes, P.E.
Feasibility Studies Engineer

SUBJECT: **R-2596** – Proposed widening of US 221 from end of four-lane divided section to NC 194; McDowell, Burke, and Avery Counties.

As requested, we have completed feasibility study R-2596 for the widening of US 221 from the end of four-lane divided section to NC 194 in McDowell, Burke, and Avery Counties. This project proposes to construct a four-lane divided section of roadway for the limits mentioned above, a distance of approximately 12.4 miles.

Our evaluation of this project was based on a four-lane shoulder section, 102 feet from edge of pavement to edge of pavement with 12-foot travel lanes, a 46-foot depressed grass median, and 8-foot shoulders (4 feet of which is paved) on 250 feet of right of way. For evaluation purposes, the project was divided into two segments. The details of each are below:

R-2596B: This segment along US 221 is from the end of the four-lane divided section to SR 1571 (English Road), a distance of approximately 6.6 miles. It is anticipated that thirty-nine (39) residences and ten (10) businesses would need to be relocated due to this project.

The estimated total cost of this section is as follows:

Construction.....	\$42,000,000
Right of Way.....	\$12,300,000
<u>Utility Relocation.....</u>	<u>\$1,500,000</u>
Total Cost (R-2596B).....	\$55,800,000

R-2596C: This segment along US 221 is from SR 1571 (English Road) to NC 194, a distance of approximately 5.8 miles. It is anticipated that twenty-two (22) residences and six (6) businesses would need to be relocated due to this project.

The estimated total cost of this section is as follows:

Construction.....	\$34,000,000
Right of Way.....	\$10,800,000
Utility Relocation.....	\$2,000,000
Total Cost (R-2596C).....	\$46,800,000

The current year Average Daily Traffic (ADT) along US 221 ranges from 2,900 vehicles per day (vpd) to 3,500 vpd. For the design year 2035, the traffic volume along US 221 is estimated to range between 4,600 vpd to 5,200 vpd. Truck traffic is estimated to make up approximately 12 percent of the daily traffic.

The existing segment of US 221 operates at a level of service (LOS) C under current traffic volumes. If no improvements are made in the 2035 design year, it is projected that the segment along US 221 will continue to operate at a LOS C. With the proposed improvements, US 221 is projected to operate at a LOS A.

Between 2004 and 2007, 45 total crashes were reported within the project limits. The crash rate for US 221 is 128.23 crashes per 100 million vehicle miles (crashes/100MVM) traveled. This rate is lower than the statewide rate of 220.00 crashes/100MVM for two-lane undivided United States routes. There were 12 non-fatal injury crashes, 32 property damage only crashes, and 1 fatal crash. The most prevalent types of crashes were Fixed Object (20%), Left Turn (18%), Animal (16%), Rear End (11%), and Sideswipe (11%).

It is anticipated that the proposed route will have railroad impacts, since it will intersect the CSX's Clinchfield Railway. At this location there is one track that carries approximately 12 to 26 freight trains per day at speeds averaging 20 to 45 miles per hour.

There are several bridges located within the project study area. See Table 1 for detailed information.

A detailed investigation was not conducted for this feasibility study, however it is anticipated that there will be possible impacts to Pisgah National Forest.

Maps at the Survey and Planning Branch of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the project study area. The following properties located within the project study area were found to be potentially historic properties:

- Linville Falls Tavern
- David Franklin Cabin
- Linville Falls Jail
- Linville Falls Post Office

Several threatened and endangered species were identified within the project study area. See Table 2 for detailed information. Significant aquatic endangered species habitats and trout streams were identified in the project study area. Several rare and unique natural areas were also identified in the project study area. See Table 3 for detailed information.

The proposed project study area is located in the French Broad and Catawba River Basins. US 221 crosses several water bodies in the project corridor. Pond Branch, Laurel Branch, Locust Spring Branch, and Brushy Creek have a stream classification of C Tr. North Fork Catawba River has stream classifications of B Tr and C Tr. These water bodies will likely need to be surveyed and have the appropriate coordination with the North Carolina Department of Environment and Natural Resources (NCDENR) and the U.S. Army Corps of Engineers (USACE) during any environmental document study. A portion of the project study area is located in a WS-IV Water Supply Watershed and a high quality water zone. Portions of the project study area are located within a floodplain.

US 221 crosses wetlands associated with Pond Branch, Laurel Branch, Locust Spring Branch, Brushy Creek, North Fork Catawba River and several jurisdictional wetland areas. Permitting with the U.S. Army Corps of Engineers (USACE) will likely need to be obtained before construction of the project, and appropriate mitigation measures should be taken if deemed necessary.

As you are aware, this work is preliminary and not the product of comprehensive environmental or design evaluations. If you should have further questions or additional information is needed, please do not hesitate to contact me at 715-5775, or via e-mail at lmhawes@ncdot.gov.

ATT: Table 1: Existing Bridge Information

Table 2: Threatened and Endangered Species

Table 3: Rare and Unique Natural Areas

Project Map

cc: Al Avant, Assistant Branch Manager – Programming
Van ArgAbright, P.E., Manager – TIP Western Region
Michael A. Pettyjohn, P.E., Division 11 Engineer
J. J. Swain, Jr., P.E., Division 13 Engineer

Table 1. Existing Bridges within the project corridor.

Avery County

Structure Number	Facility Carried	Feature Intersected	Structure Description	Structure Length	Vertical Clearance	Horizontal Clearance	Year Constructed	Sufficiency Rating
11	Blue Ridge	US 221	Stone-face reinforced concrete arch	144'	14.5'	39.2'	1940	0.0

McDowell County

Structure Number	Facility Carried	Feature Intersected	Structure Description	Structure Length	Vertical Clearance	Horizontal Clearance	Year Constructed	Sufficiency Rating
114	SR 1569	North Fork Catawba River	Prestressed concrete cored slab	91'	N/A	23.8'	1970	85.0
115	SR 1569	North Fork Catawba River	Prestressed concrete cored slab	72'	N/A	24.8'	1985	100.0
C117	US 221	North Fork Catawba River	Quadruple 10' x 6' RCBC	49'	N/A	20.0'	1952	99.1
119	US 221	North Fork Catawba River	Reinforced concrete deck on girders	73'	N/A	24.0'	1938	57.3
129	Clinchfield Railroad	US 221	Reinforced concrete slab	28'	14.9'	23.2'	1928	N/A
130	US 221	Pond Branch	Triple 7' x 5' RCBC	22'	N/A	20.0'	1958	99.7
285	SR 1571	North Fork Catawba River	Timber floor on I-beams	69'	N/A	13.1'	1959	62.5

Table 1. Threatened and endangered species within the project corridor.

Common Name	Scientific Name	Federal Status	State Status
Alga-like Matted Moss	<i>Platydictya confervoides</i>		SR-P
American Bittersweet	<i>Celastrus scandens</i>		SR-P
Bradley's Spleenwort	<i>Asplenium bradleyi</i>		SR-P
Closter's Brook-Hypnum	<i>Hygrohypnum closteri</i>		SR-T
Coastal Virgin's-bower	<i>Clemaris catesbyena</i>		SR-L
Copper Moss	<i>Scopelophila ligulata</i>		SR-O
Drummond Moss	<i>Orthorichum strangulation</i>		SR-P
Extinguishing Moss	<i>Encalypta procera</i>		SR-D
Fallacious Screw Moss	<i>Didymodon fallax</i>		SR-O
Lime Entodon	<i>Entodon concinnus</i>		SR-P
Lime-Seep Eucladium	<i>Eucladium verticillatum</i>		SR-O
Linville Caverns Spider	<i>Nesticus carolinesis</i>		SR
Liverwort	<i>Lejeunea blomquisti</i>		SR-L
Liverwort	<i>Mannia californica</i>		SR-T
Liverwort	<i>Plagiochila sullivanii</i> var <i>sullivanii</i>	FSC	SR-T
Liverwort	<i>Plagiochila virginica</i> var <i>virginica</i>		SR-L
Liverwort	<i>Porella wataugensis</i>	FSC	SR-L
Rich-woods sedge	<i>Carex oligocarpa</i>		SR-P
Rough Blazing Star	<i>Liatris aspera</i>		SR-P
Sullivan's Entodon	<i>Entodon sullivanii</i>		SR-O
Three-ranked Didymodon	<i>Didymodon tophaceus</i>		SR -O
Transparent Fork Moss	<i>Dichodontium pellucidum</i>		SR-P
Wall-Rue Spleenwort	<i>Asplenium ruta-muraria</i>		SR-P
White Rattlesnakeroot	<i>Premathes alba</i>		SR-P

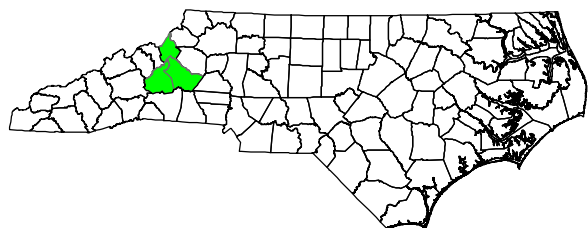
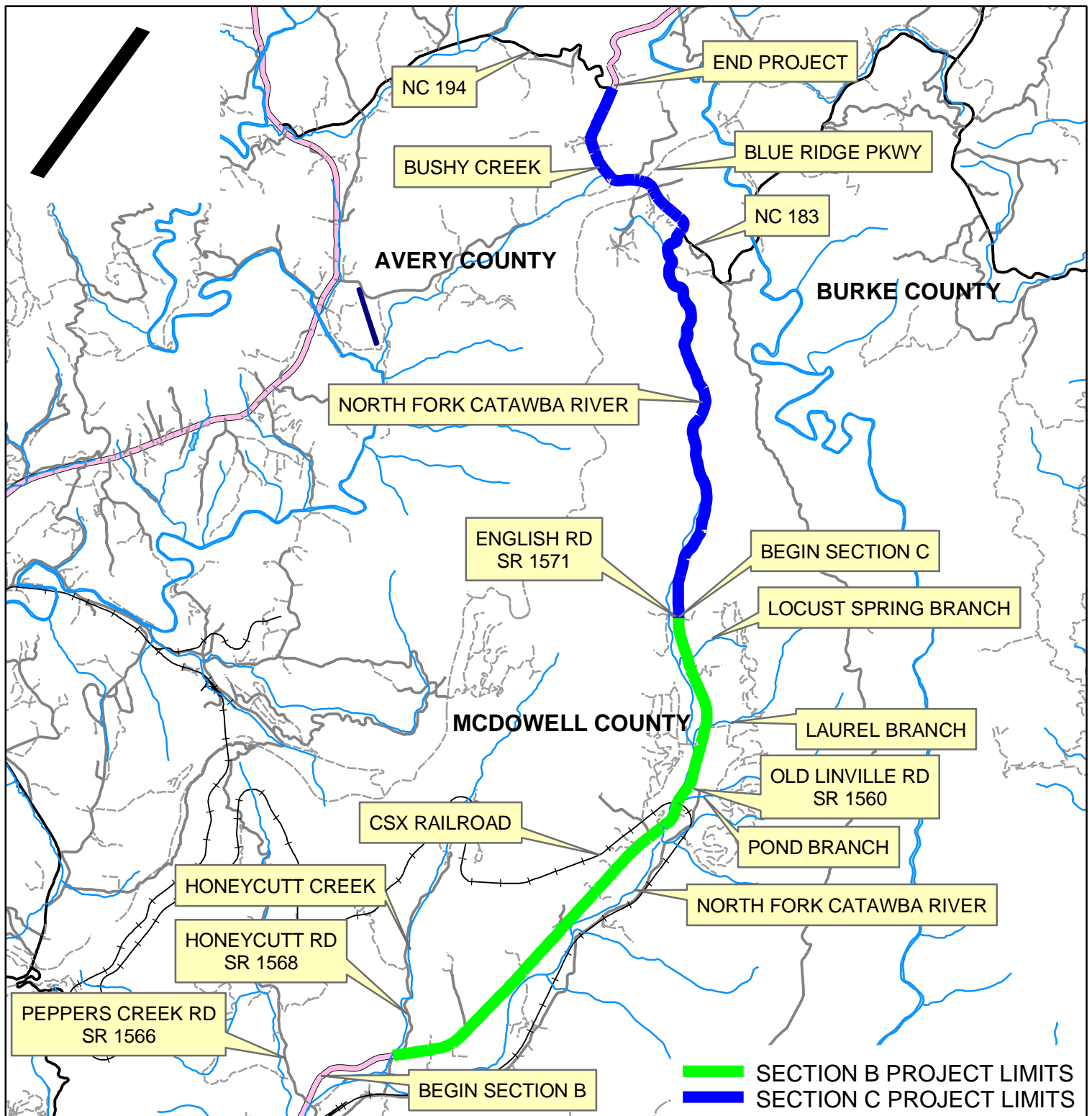
Definitions of Federal Status: T=Threatened, FSC=Federal "Species of Concern"

Definitions of State Status: T=Threatened, SR=Significantly Rare, SC=Special Concern, -P=Peripheral

Definitions of State Status: -L=Limited in NC, -T=Throughout the species, -D=Disjunct, -O=Other

Table 2. Rare and Unique Natural Areas within the project corridor.

Name	Area Type
Basic Mesic Forest	Natural Community
Basic Oak-Hickory Forest	Natural Community
Chestnut Oak Forest	Natural Community
Montane Acidic Cliff	Natural Community
Montane Calcareous Cliff	Natural Community
Rich Cove Forest	Natural Community
Linville Caverns RHA	Dedicated Natural Preserve, Significant Natural Heritage Area
Catawba River Dolomite Area	Significant Natural Heritage Area
North Fork Catawba River Aquatic Habitat	Significant Natural Heritage Area
Linville Mountain Natural Area	Significant Natural Heritage Area
Blue Ridge Parkway	Natural Heritage Program Managed Area
Pisgah National Forest	Natural Heritage Program Managed Area



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROGRAM DEVELOPMENT BRANCH

R-2596 - SECTIONS B & C

US 221

FROM END OF FOUR-LANE DIVIDED SECTION
TO NC 194

MCDOWELL, BURKE, & AVERY COUNTIES

DIVISIONS 13 & 11

FIGURE 1